

REMARKS

Claims 1-3, 10-12, 15, 16 and 19-22 are pending in this application, of which claim 1, 10, 19 and 20 have been amended. Claim 4 has been canceled. No new claims have been added. The support for the claim amendments are as follows: claim 1: (claim 10); claim 10: (claim 19); and claims 19-20: (grammatical amendments). No new matter is added.

Claims 4/1, 4/2, and 4/3 are rejected under 35 U.S.C. 103(a) as being unpatentable over the admitted prior art in view of Nichol and Nagata et al. for the same reasons as expressed in paragraph 2 of the Office Action dated January 22, 2008. (Office Action, p. 2)

Claim 4 has been amended making this rejection now moot.

Claims 1-3, 4/1, 4/2, 4/3, 10-12, and 19-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over the admitted prior art in view of Nichol and Nagata et al. further taken with Soviet Union Patent 1074719 and optionally further taken with Japanese Patent 2-60674. (Office Action p. 2)

As will be shown herein, the claimed invention can achieve excellent surface smoothness and aesthetic appeal of a laminated object wherein a *flexible thin material* is provided on a wood substrate. Due to synergistic effect of the combination of claimed process steps, *unexpected results* are achieved. On the other hand, when a flexible thin material is adhered to a wood substrate by methods known in the prior art, the inequality of the coated surface of the substrate tends to appear after the flexible thin material is applied. The combined disclosures or teachings of Nagata, Nichol, Soviet Union Patent 1074719 (SU'719) and JP 2-60674 (JP'674) do not logically make claim 1 obvious for several reasons.

The Cited Art

Nichol discloses a method for joining waxed paperboard surfaces. Glue is coated, from a lower side, on partial portions of the waxed paperboard. The coated paperboard is folded to form a container such that the coated portions of the paperboard are adhered to other portions thereof to which glue is not coated.

Nagata discloses a reactive hot melt type adhesive composition. No specific adhesive coating method using rollers is disclosed in Nagata.

Soviet Union Patent 1074719 discloses a roller coating mechanism which is disposed above a wooden substance, and the mechanism has a metering roller associated with the coating roller as well as a pool of adhesive. A wooden board is coated with an adhesive. SU'719 fails to disclose that the adhesive layer formed on the wood substrate is subsequently adhered with a flexible thin laminate such as a film, a decorative paper, a laminate material and a metallic paper.

Rather, as evidenced by the title of SU'719, the mechanism provides a plywood glue applicator by which design and function are improved due to glue lifting chambers, wherein a bottom roller lifts glue from a lower chamber to an upper position. As described in the Office Action, the purpose of the adhesive coating of SU'719 is to produce a plywood. Plywood is a material made of several thin wooden sheets which are stuck together to form a strong board. SU'719 discloses a plywood glue applicator which is used for a method wherein a glue is coated on an inflexible wooden sheet or strip, another inflexible wooden sheet or strip is provided on the coated wooden sheet or strip, and the step is repeated to form plywood.

SU'719 nowhere discloses that a *flexible sheet* is provided on a wooden substrate on which an adhesive has been coated.

JP 2-60674 discloses a manufacturing method of a "go" game board or "shogi" game board, wherein all of an upper surface, a reverse surface and four side surfaces of the board have a straight wood grain. (Go and shogi are eastern board games wherein stones or pieces are used on a board on which a grid pattern is provided.) As shown in Fig. 3 (a) to 3(c) of JP'674, after plural plates are coated with an adhesive, they are laminated and pressed to form a flitch, which means a wooden material having a form of sawn lumber, and finally, conversion of the timber (flitch) is conducted to form a go board or shogi board.

JP'674 fails to disclose that the adhesive layer formed on the wood substrate is bonded with a *flexible thin laminate* such as a film, a decorative paper, a laminate material and a metallic paper. Conversely, JP'674 discloses forming a thick laminate obtained from many wood boards with a colored adhesive, which is a completely different process.

The Claimed Invention

Claims 1 and 10 are amended in order to overcome the rejections. Claims 1 and 10 disclose a method which can provide a smooth surface object, which is not achievable by the prior art methods.

Claim 1 has the following steps (i) to (viii) and claim 10 has the steps of (ii) to (viii):

- (i) A hot melt adhesive, which is a urethane reactive hot melt adhesive and melts in a temperature range of 100 to 130°C, is used;
- (ii) A wood board is used as a substrate;
- (iii) The wood board is conveyed at a predetermined speed;
- (iv) An applicator roller is used and rotated in the direction to which the substrate is moved, and a circumferential speed of the roller is at least 20% slower or at least 20% faster than the predetermined speed of the substrate;
- (v) The wood board is covered with the adhesive in a melted state supplied from a pool of the hot melt adhesive existing in a valley formed by the applicator roller and a metering roller via an interface of the roller;
- (vi) The upper surface of the substrate is contacted from above with the applicator roller;
- (vii) The adhesive layer is formed on substantially the entirety of the upper surface of the substrate with the adhesive; and
- (viii) The adhesive layer formed on the wood substrate is bonded with a laminate, which is selected from the group consisting of a film, a decorative paper, a laminate material and a metallic paper, to obtain a laminated object.

The Rejection

The references fail to teach or suggest the claimed method as follows:

Nichol fails to disclose or teach the limitations of (i), (ii), (iii), (v), (vi), (vii) and (viii).

Nagata fails to disclose or teach the limitations of (ii) to (viii).

SU'719 fails disclose or teach the limitations of (i), (iv), (vii) and (viii).

JP'674 fails to disclose or teach the limitations of (i), (iv) and (viii).

In combination, the references fail to teach the invention as now claimed for several reasons including: the fact that the references teach unrelated laminated processes (Nichol – joining waxed paperboard; Nagata – a composition; JP’674 and SU’710 - making plywood); none of the references disclose (viii); none of the references teach the claimed step order or its advantages; and none of the references teach the combination of the critical step of applicator roller speed and the application of a flexible thin film laminate and the advantages of such a combination.

The Office Action described on page 4 that the admitted prior art suggested that it was known to apply decorative paper or films to the adhesive coated wooden substrate to make various furnishing and interior materials. However, unlike the claimed invention, conventional methods *cannot achieve a laminated object which has excellent surface smoothness* and aesthetic appeal. The technical reason is that, in the conventional method, a water emulsion adhesive or solvent adhesive is coated on a wood substrate with an applicator roller at a circumferential speed wherein the absolute value ((circumferential speed of an applicator roller - sending speed of the substrate) / sending speed of the substrate) × 100) is less than 20%. Please refer to Comparative Examples 1 and 2 of the present specification on p.28-29. It is described that the poor appearance of laminated objects was observed when a circumferential speed of an applicator roller, *a critical step*, is not considered:

COMPARATIVE EXAMPLE 1

[0147] In the first embodiment, setting the circumferential speed of the first and second applicator rollers to be the same as the predetermined speed at which the substrate is conveyed led to the surface of the adhesive layer not being smooth, with ripples, so that an aesthetically pleasing laminated object was not obtained.

COMPARATIVE EXAMPLE 2

[0148] In the first example, reducing the circumferential speed of the first and second applicator rollers by 15% relative to the predetermined speed at which the substrate is conveyed led to the surface of the adhesive layer lacking smoothness and being rippled, so that an aesthetically pleasing laminated object was not obtained.

[0149] When adapting a conventional coating method that uses a roller coater to

apply a hot melt adhesive, in which the circumferential speed of the applicator roller and the predetermined speed at which the substrate is conveyed are nearly the same, in addition to indentations remaining due to the surface of the adhesive layer not being leveled, roughening of the substrate surface occurs.

In Nichol, SU'719 and JP'674, rigid plate materials are adhered to each other. In such a case, it is possible to adhere them to each other with an adhesive by merely pressing them from both sides. Furthermore, even if the adhesive is coated irregularly, it is possible to achieve the adhesiveness, and a good appearance of the laminated object can be obtained since inflexible boards are used.

On the other hand, when a *flexible thin material is adhered to a wood substrate*, the inequality of the coated surface of the substrate tends to appear after the flexible thin material is applied to the coated substrate.

The claimed invention can achieve excellent surface smoothness and aesthetic appeal of a laminated object, wherein a flexible thin material is applied to a wood substrate. Due to synergistic effect of the combination of (i) to (viii), unexpected effects are achieved in the instant invention.

The combined disclosure or teachings of Nagata, Nichol, SU'719 and JP'674 do not read on claims 1 or 10 as a whole. Claims 1 and 10 as a whole are nowhere disclosed or taught by Nagata, Nichol, SU'719 and JP'674 alone or in combination. Accordingly, claims 1 and 10, and claims dependent thereon, are believed to be allowable.

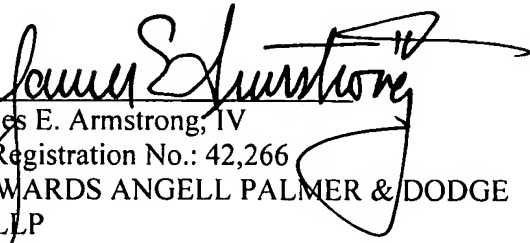
The Director is hereby authorized to charge any deficiency in the fees filed, asserted to be filed or which should have been filed herewith (or with any paper hereafter filed in this application by this firm) to our Deposit Account No. 04-1105.

In view of the above amendment, applicant believes the pending application is in condition for allowance.

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Respectfully submitted,

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